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AUTHOR Levin, James; And Others
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ABSTRACT

This report describes a computer assisted process that resulted in the development of a comprehensive database of actual courses taken by undergraduates in teacher preparation programs for use in decision making about possible curriculum redesign for teacher education majors. The creation of the database required four stages: (1) selecting majors from the College of Education and other academic areas corresponding to one of the College of Education majors for analysis and comparison; (2) defining majors and dividing them into subject categories; (3) classifying majors in terms of subject category courses, courses taken but not categorized, and required courses not taken; and (4) describing majors in terms of individual student credit information. While the primary focus of the present study was to compare the actual consumed curriculum of teacher education with their counterparts in other colleges, the database created from the study could be useful to a variety of audiences depending on the issues or questions to be addressed. Sample data are presented in four tables and three figures. (DB)

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THE TEACHER EDUCATION CURRICULUM:

A COMPUTER-ASSISTED PROCESS FOR INFORMED DECISION-MAKING

by

James Levin, Keith Hillkirk and Cecil Trueblood

U.S. DEPARTMENT OF EDUCATION
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Much recent attention in the mass media and professional literature has focused on the reform of preservice teacher education (Lasley, 1989). Groups including the Rand Corporation (Darling-Hammond, 1984), the Carnegie Forum on Education and the Economy (1986), the Holmes Group (1986), and the California Commission on the Teaching Profession (1985) have issued reports calling for sweeping changes in the undergraduate curriculum. Prominent detractors have characterized teacher education curricula as "vacuous" (Lasley, 1989) which has influenced trends in some states toward increased emphasis on academic discipline study at the expense of decreased preparation in pedagogy and related fields (Galambos, Cornett, and Spitler, p. 1)

Typical of educational controversies, such calls for reform have often been based on strongly-held opinions, lacking support from a comprehensive empirical database which is essential to data-based decision-making. Galambos et. al. (1985) point out:

> What is missing in most of the pronouncements and actions on teacher education is definitive information about what teachers are now taking in college (p.1).

As further noted by the Southern Regional Education Board in its review and analysis of undergraduate transcripts, proposals for the reform of teacher education "are unlikely to be effective if they fail to address the reality of current teacher preparation programs" (Galambos et. al., (p. 1).

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In response to calls for the revision of undergraduate teacher preparation at a large mid-eastern university, a study was undertaken to provide such documented evidence of the actual courses taken by undergraduates in a variety of majors. The purpose of this article is to describe a computer-assisted process which resulted in the development of a comprehensive database that proved useful in quantitatively describing the present educational environment of selected university programs, as well as supporting informed decisions about possible curriculum redesign for its teacher education majors.

Procedures

The creation of the database required a four-stage process: Selecting Majors, Defining Majors by Describing Content Categories, Analyzing Majors, and Describing Majors. Each stage is sequentially described below.

1. Selecting Majors

Ten majors were selected for analysis and comparison. Five of the majors were from the College of Education. Each of the remaining five majors represented an academic area that corresponded to one of the College of Education majors. For example, the Mathematics Major from the College of Science was selected as the corresponding major to the major of Mathematics Education in the College of Education.

Following the selection of majors, transcripts for the 1986-87 graduates from each major were obtained. Sample sizes varied depending upon the size of the graduating class. Table 1 lists the 10 majors and sample sizes. Education majors are listed in column one adjacent to their comparative majors from other colleges in column two.

2. Defining Majors by Describing Content Categories

Four main course categories emitting form the national reports were

used to describe the majors: General Education, Content Specialization, Professional Requirements, and Electives. Each category was then further defined and sub-divided into several content related sub-categories as follows:

Category 1

GENERAL EDUCATION--Courses approved by the mid-eastern University's Faculty Senate and required of all undergraduate students in the following sub-categories:

Sub-categories

- Communications
- Quantification
- Natural Science
- Art
- Humanities
- Social/Behavioral Sciences
- Health and Physical Education

Category 2

CONTENT SPECIALIZATION--Courses required by the student's college, major, or option.

Sub-categories:

- Communications
- Quantification
- Natural Sciences
- Arts
- Humanities
- Social/Behavioral Science
- Other

TABLE 1: SELECTED MAJORS AND SAMPLE SIZES

EDUCATION MAJORS	N	NON-EDUCATION MAJORS	N
Early Childhood/Elementary Education	41	Liberal Arts - General Arts and Science	1
Secondary Education - Biology	9	Science - Biology	2
Secondary Education - Chemistry	6	Science - Chemistry	2
Secondary Education - English	7	Liberal Arts - English	2
Secondary Education - Mathematics	24	Science - Mathematics	2

Category 3

PROFESSIONAL REQUIREMENTS--Courses taken by education majors only, required by the student's major or option.

Sub-categories:

Professional Knowledge Base--Courses that augment a student's understanding of such areas as history and philosophy of education, human development, learning theory, and measurement and evaluation of learning.

Pedagogy--Courses that emphasize the knowledge base of planning and delivering instruction.

Field Experiences--Practicum courses which occur in school or day-care settings.

Category 4

ELECTIVES--All courses which did not meet any of the previously-defined categories or were specified as free electives by the student's college, major, or option.

Sub-categories:

Content-Related--Courses from the same discipline(s) as those defined under content specialization.

Professional-Related--Courses that were similar to those defined under professional requirements.

Other--Courses that were not Content-or Professional-related.

Table 2 lists Content Categories and the abbreviations used to classify courses. It should be noted in Table 2 that Content Specialization and Elective courses were further classified as Freshman and Sophomore (F/S) or Junior and Senior (J/S) level courses. On rare occasions, the University permits some courses to meet multiple requirements such as

both General Education and Content Specialization, Professional Requirements, or Electives. The classification system was designed to accomodate the above instances by distinguishing which courses were or were not General Education.

3. Analyzing Majors

Using the University's Bulletin of Baccalaureate Programs, each of the 10 selected majors' official curriculum was analyzed. Each course taken within a particular major was classified into one of the previously defined content categories. As illustrated in Table 3, these classifications resulted in a course-by-content-category matrix for each major.

Each matrix and student transcript was then input into the computer. A computer software program which compared each course listed on a student's transcript with the appropriate matrix was used to categorize each course into the correct content category. Output resulted in three lists of courses: content-categorized courses, courses taken but not categorized, and required courses not taken by the student. Table 4 provides an example of the output generated for each student.

This student output was then analyzed by hand. Courses Taken But Not Categorized were compared to Courses Required But Not Taken by the student. There were three results of this comparison: (1) most frequently, substitution courses were identified; or (2) courses taken that were not used as substitute courses were categorized within the appropriate elective category; or (3) on rare occasions, there remained courses required for which substitutions were not found, thereby illustrating that occasionally the official curriculum had not been followed.

TABLE 2: CONTENT CATEGORIES DEFINITIONS AND ABREVIATIONS

GENERAL EDUCATION

GECOM - GENERAL EDUCATION / COMMUNICATIONS
GEQUAC - GENERAL EDUCATION / QUANTIFICATION (CALCULUS)
GEQUAN - GENERAL EDUCATION / QUANTIFICATION (NON-CALCULUS)
GENSCT - GENERAL EDUCATION / NATURAL SCIENCE (TECHNICAL)
GENSCN - GENERAL EDUCATION / NATURAL SCIENCE (NON-TECHNICAL)
GEART - GENERAL EDUCATION / ARTS
GEHUM - GENERAL EDUCATION / HUMANITIES
GESBS - GENERAL EDUCATION / SOCIAL BEHAVIORAL SCIENCE
GEHPE - GENERAL EDUCATION / HEALTH, PHYSICAL EDUCATION

CONTENT SPECIALIZATION

CSCBDRL - CONTENT SPECIALIZATION / COMMUNICATIONS, GENERAL EDUCATION (F/S)
CSCBDRG - CONTENT SPECIALIZATION / COMMUNICATIONS, GENERAL EDUCATION (J/S)
CSCNBDL - CONTENT SPECIALIZATION / COMMUNICATIONS, NON GENERAL EDUCATION (F/S)
CSCNBDG - CONTENT SPECIALIZATION / COMMUNICATIONS, NON GENERAL EDUCATION (J/S)
CSQBDRL - CONTENT SPECIALIZATION / QUANTIFICATION, GENERAL EDUCATION (F/S)
CSQBDRG - CONTENT SPECIALIZATION / QUANTIFICATION, GENERAL EDUCATION (J/S)
CSQNBDL - CONTENT SPECIALIZATION / QUANTIFICATION, NON GENERAL EDUCATION (F/S)
CSQNBDG - CONTENT SPECIALIZATION / QUANTIFICATION, NON GENERAL EDUCATION (J/S)
CSNBDRL - CONTENT SPECIALIZATION / NATURAL SCIENCE, GENERAL EDUCATION (F/S)
CSNBDRG - CONTENT SPECIALIZATION / NATURAL SCIENCE, GENERAL EDUCATION (J/S)
CSNNBDL - CONTENT SPECIALIZATION / NATURAL SCIENCE, NON GENERAL EDUCATION (F/S)
CDNNBDG - CONTENT SPECIALIZATION / NATURAL SCIENCE, NON GENERAL EDUCATION (J/S)
CSABDRL - CONTENT SPECIALIZATION / ARTS, GENERAL EDUCATION (F/S)
CSABDGR - CONTENT SPECIALIZATION / ARTS, GENERAL EDUCATION (J/S)
CSANBDL - CONTENT SPECIALIZATION / ARTS, NON GENERAL EDUCATION (F/S)
CSANBDG - CONTENT SPECIALIZATION / ARTS, NON GENERAL EDUCATION (J/S)
CSHBDRL - CONTENT SPECIALIZATION / HUMANITIES GENERAL EDUCATION (F/S)
CSHBDRG - CONTENT SPECIALIZATION / HUMANITIES GENERAL EDUCATION (J/S)
CSHNBDL - CONTENT SPECIALIZATION / HUMANITIES NON GENERAL EDUCATION (F/S)
CSHNBDG - CONTENT SPECIALIZATION / HUMANITIES NON GENERAL EDUCATION (J/S)
CSSBDRL - CONTENT SPECIALIZATION / SOCIAL BEHAVIORAL SCIENCE GENERAL EDUCATION (F/S)
CSSBDEG - CONTENT SPECIALIZATION / SOCIAL BEHAVIORAL SCIENCE GENERAL EDUCATION (J/S)
CSSNBDL - CONTENT SPECIALIZATION / SOCIAL BEHAVIORAL SCIENCE NON GENERAL EDUCATION (F/S)
CSSNBDG - CONTENT SPECIALIZATION / SOCIAL BEHAVIORAL SCIENCE NON GENERAL EDUCATION (J/S)

CONTENT SPECIALIZATION CONTINUED

CSOBDRL - CONTENT SPECIALIZATION, OTHER GENERAL EDUCATION (F/S)
CSOBDRG - CONTENT SPECIALIZATION, OTHER GENERAL EDUCATION (J/S)
CSONBDL - CONTENT SPECIALIZATION, NON GENERAL EDUCATION (F/S)
CSONBDG - CONTENT SPECIALIZATION, NON GENERAL EDUCATION (J/S)

PROFESSIONAL REQUIREMENTS

PRKBDR - PROFESSIONAL REQUIREMENT / KNOWLEDGE BASE, GENERAL EDUCATION
PRKNBDR - PROFESSIONAL REQUIREMENT / KNOWLEDGE BASE, NON GENERAL EDUCATION
PRP - PROFESSIONAL REQUIREMENT / PEDAGOGY
PRF - PROFESSIONAL REQUIREMENT / FIELD EXPERIENCES

ELECTIVES

ECRL - ELECTIVE / CONTENT RELATED (F/S)
ECRG - ELECTIVE / CONTENT RELATED (J/S)
EPRL - ELECTIVE / PROFESSIONAL RELATED (F/S)
EPRG - ELECTIVE / PROFESSIONAL RELATED (J/S)
EOL - ELECTIVE / OTHER (F/S)
EOG - ELECTIVE / OTHER (J/S)

TABLE 3: COURSE BY CONTENT CATEGORY MATRIX

COURSES	CONTENT CATEGORIES			
	GENERAL EDUCATION (See Table 2 for subcategories)	CONTENT SPECIALIZATION (See Table 2 for subcategories)	PROFESSIONAL REQUIREMENTS (See Table 2 for subcategories)	ELECTIVES (See Table 2 for subcategories)
ENGL 15				
SPCOM 100A				
.				
.				
.				
.				
CHEM 12				
MATH 140				
.				
.				
.				
.				
C +I 411				
SCI ED 411				
.				
.				
.				
.				
C + S 405				

TABLE 4: COMPUTER OUTPUT

CONTENT CATEGORY	CREDITS #
GECOM	6
GEQUAC	4
GEQUAN	4
GENSCT	0
GENSCN	0
GEART	6
GEHUM	6
GESBS	6
GEHPE	3
CACBDRL	0
CSCBORG	0
CSCNBDL	0
CSCNBDG	0
CSQBDRL	4
CSQBORG	0
CSQNBDL	9
CSQNBDG	15
CSNBDRL	0
CSNBORG	0
CSNNBDL	0
CSNNBDG	0
CSABDRL	0
CSABORG	0
CSANBDL	0
CSANBDG	0
CSHBDRL	0
CSHBDRG	0
CSHNBDL	0
CSHNBDL	0
CSHNBDG	0
CSSBDRL	0
CSSBDRG	0
CSSNBDL	0
CSSNBDG	0
CSOBDRL	0
CSOBDRG	0
CSONBDL	0
CSONBDG	0
PRKBDR	7
PRKNBDR	6
PRP	12
PRF	20
ECRL	0
ECRG	0
EPRL	0
EPRG	0
EOL	0
EOG	0

COURSES TAKEN BUT NOT CATEGORIZED	
BI SC 001	3
BI SC 002	3
EDPSY 104H	3
EDTHP 115H	3
INSYS 441	3
MATH 040	5
MTHED 496	3
MUSIC 051	1
P E 058	0.5
P E 357	0.5
PH SC 007	3
SPCOM 100A	3

COURSES REQUIRED BUT NOT TAKEN
C I 495A
C I 495AB
EDPSY 014
EDTHP 115
SPCOM 100

Describing Majors

Individual student outputs for each major were combined to provide a composite description of the major. The composite indicated the average number of credits in each of the 47 content sub-categories. Each major composite was then represented graphically as illustrated in Figure 1.

These graphic representations allowed for accurate graphic comparisons with other majors as shown in Figure 2.

Finally, the 47 content sub-categories were collapsed into 20 categories. These categories were then used to graphically represent and compare majors as in Figure 3 which is a comparison between the major of Mathematics in the College of Science and Mathematics Education in the College of Education.

Implications

Creation of a database such as the one described in this paper makes possible decision-making based upon empirical evidence rather than subjective opinion or popular belief. As previously shown by Levin and Wyckoff (1987), a variety of audiences can find such databases useful depending upon the issues or questions to be addressed. While the primary focus of the present study was to compare the actual consumed curriculum of teacher education majors with their counterparts in other colleges, this database could readily be used to provide information to answer other questions as well. Examples of such additional questions include

1. How does the consumed curriculum differ from the official curriculum as listed in the college bulletin?
2. How would proposed curriculum revisions compare to the present curriculum?
3. How do students use elective credits?
4. How does the consumed curriculum (of any program) compare with

public and professional perceptions of the curriculum?

5. For students and academic advisors, how do course and credit requirements of various programs of study compare with one another and how do students' interests and abilities relate to the programs?

Whether the interested constituency be teacher educators, students, academic advisors, or any other group considering curriculum policy decisions, use of the computer-assisted process described in this paper can provide empirical support for informed decision-making. The process also results in an empirical database which can be utilized to answer a wide variety of curriculum questions.

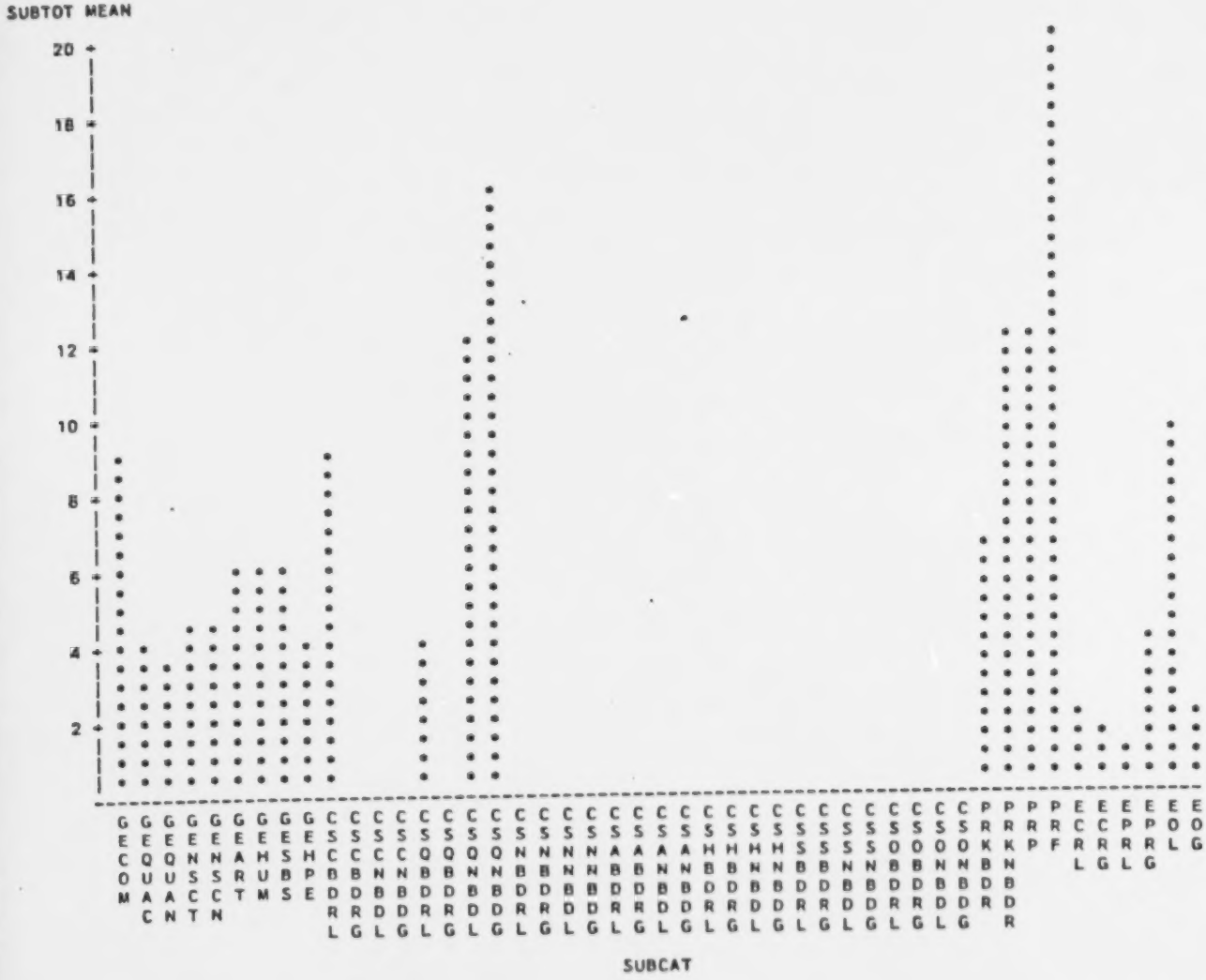

Figure 1: Mean Number of Credits per Content Sub-Category for Mathematics Education Major

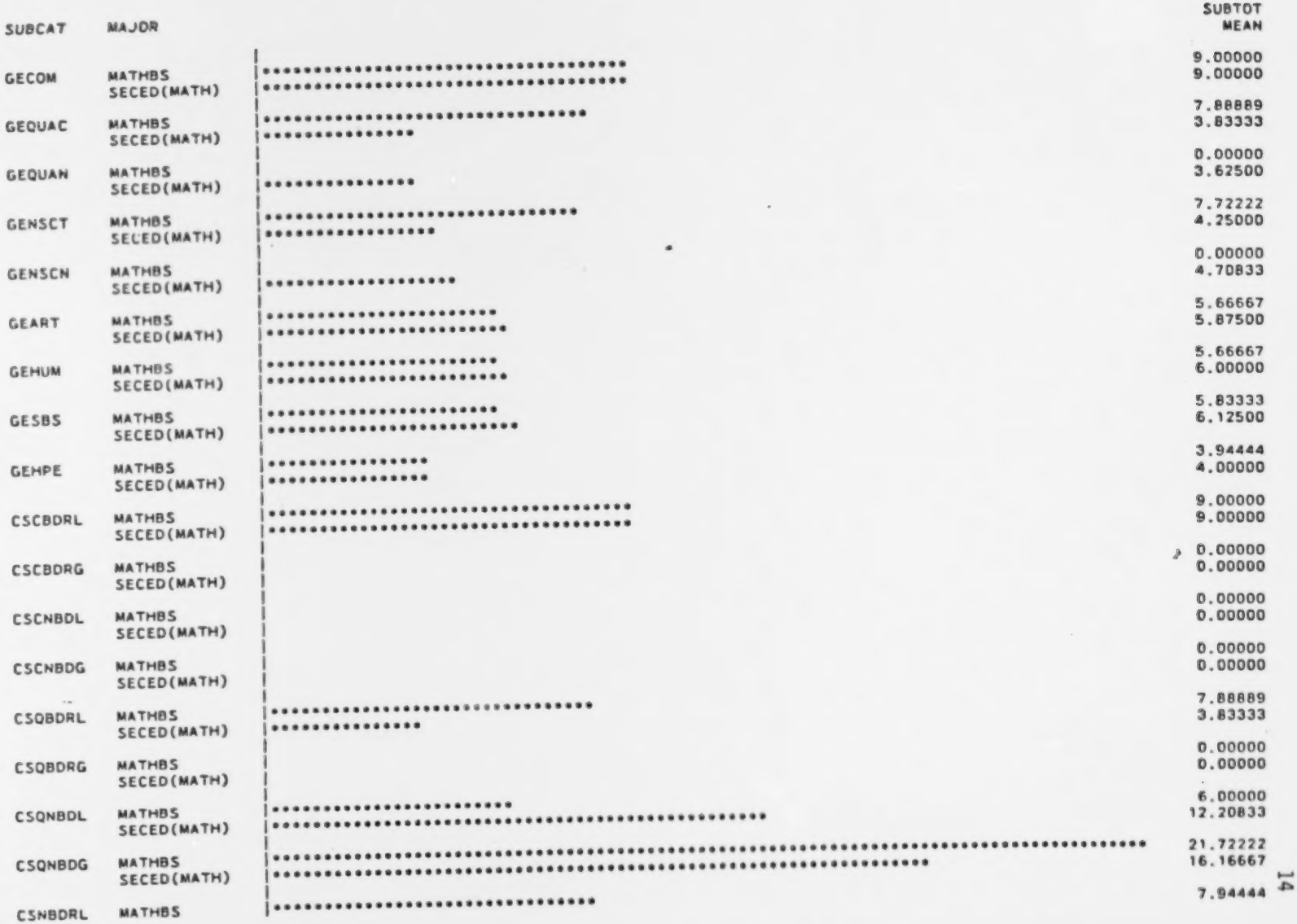

Figure 2: Comparison of Mean Number of Credits per Content Sub-Category for the Majors of Mathematics Education and College of Science-Mathematics.

SUBCAT	MAJOR		SUBTOT MEAN
	SECED(MATH)		0.00000
CSNBDRG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSNNBDL	MATHBS	**********	13.27778
	SECED(MATH)		0.00000
CSNNBDG	MATHBS	**********	3.94444
	SECED(MATH)		0.00000
CSABDRL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSABDRG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSANBDL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSANBDG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSHBDRL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSHBDRG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSHNBDL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSHNBDG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSSBDRL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSSBDRG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSSNBDL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSSNBDG	MATHBS		0.00000
	SECED(MATH)		0.00000
CSOBDRL	MATHBS		0.00000
	SECED(MATH)		0.00000
CSOBDRG	MATHBS		0.00000
	SECED(MATH)		0.00000

Figure 2: cont.

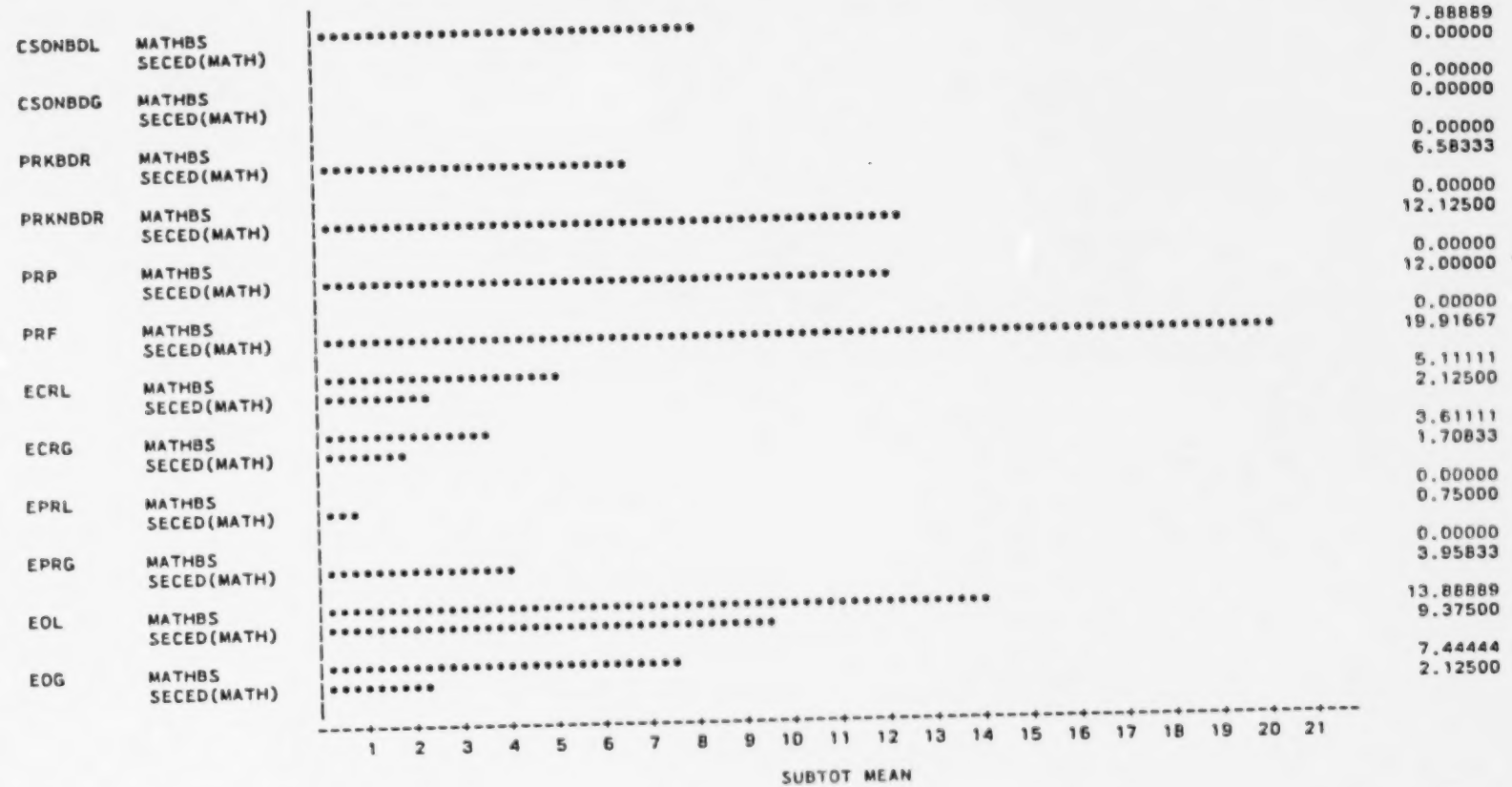
CSONBDL MATHBS SECED(MATH) 7.88889 0.00000
CSONBDG MATHBS SECED(MATH) 0.00000 0.00000
PRKBDR MATHBS SECED(MATH) 0.00000 6.58333
PRKNBDR MATHBS SECED(MATH) 0.00000 12.12500
PRP MATHBS SECED(MATH) 0.00000 12.00000
PRF MATHBS SECED(MATH) 0.00000 19.91667
ECRL MATHBS SECED(MATH) 5.11111 2.12500
ECRG MATHBS SECED(MATH) 3.61111 1.70833
EPRL MATHBS SECED(MATH) 0.00000 0.75000
EPRG MATHBS SECED(MATH) 0.00000 3.95833
EOL MATHBS SECED(MATH) 13.88889 9.37500
EOG MATHBS SECED(MATH) 7.44444 2.12500
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
SUBTOT MEAN

Figure 2: cont.

SUBCAT	MAJOR		SUBTOT MEAN
GECOM	MATHBS	••••••••••••••••••	9.00000
	SECED(MATH)	••••••••••••••••••	9.00000
GEQ	MATHBS	•••••••••••••••••	7.88889
	SECED(MATH)	••••••••••••••••	7.45833
GEN	MATHBS	••••••••••••••••	7.72222
	SECED(MATH)	••••••••••••••••••	8.95833
GEART	MATHBS	••••••••••••	5.66667
	SECED(MATH)	••••••••••••••	5.87500
GEHUM	MATHBS	••••••••••••	5.66667
	SECED(MATH)	••••••••••••••	6.00000
GESBS	MATHBS	••••••••••••••	5.83333
	SECED(MATH)	••••••••••••••	6.12500
GEHPE	MATHDS	••••••••	3.94444
	SECED(MATH)	••••••••	4.00000
CSC	MATHBS	••••••••••••••••••	9.00000
	SECED(MATH)	••••••••••••••••••	9.00000
CSQ	MATHBS	•••••••••••••••••

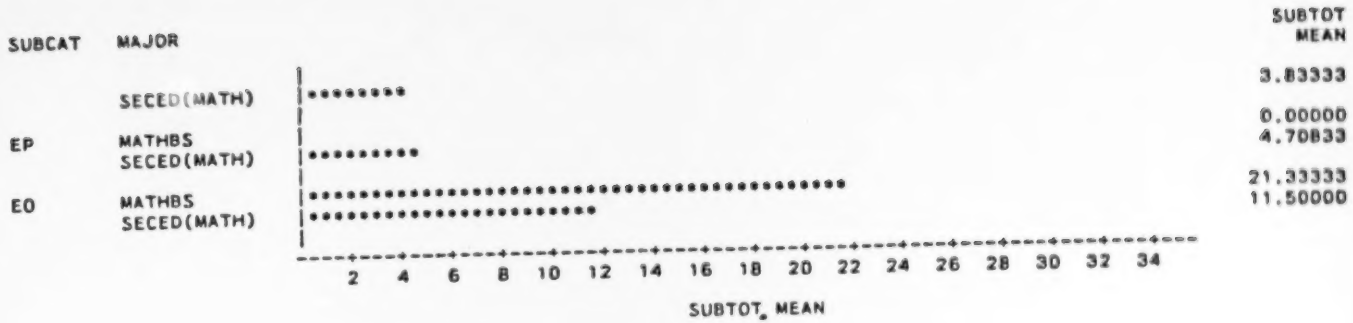

Figure 3: cont.

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